ABSTRACT

Seismic detection apparatus comprising seismic detection means capable of detecting a plurality of seismic components over a defined tetrahedral volume is provided. The seismic detection means comprises four three-component geophones. Seismic data acquired by the geophones is processed to separate P-wave components from S-wave components. The geophones are spaced apart by distances smaller than the wavelength of the detected seismic components. The apparatus may be used on surface or in a marine environment or transition zone. A method of processing seismic data is also provided comprising acquiring seismic data relating to a wavefield over a selected volume of acquisition, and measuring the curl and divergence of the wavefield from the seismic data, to thereby identify seismic components within the seismic data. Additionally, an apparatus and method for hydrocarbon exploration is disclosed for using three or more seismic receivers placed in a plane and spaced closely to each other.